	TANTA UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF ELECTRONICS & ELECTRICAL COMMUNICATION ENGINEERING EXAMINATION (*Second* YEAR)		
	COURSE TITLE: Communication theory		COURSE CODE: EEC 2102
DATE:10 /1/2013	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 3 HOURS

Answer the following questions

PROBLEM # ONE (25 mark)

I. Write short notes about the following:

a. Energy and power signals.
b. Bandwidth in different AM modulation techniques.
c. Interrelation between frequency modulation and phase modulation.
d. Frequency deviation and phase deviation.
e. Modulation and its benefits.

II. Find Fourier transform for the following signals

a. Sgn(t) b. A sinc(2Wt) c. 3rect(t/30) u(t) d. rect((t-1)/2)+tri((t-3)/3)

PROBLEM # TWO (25 mark)

I. Explain, with the aid of drawing, how Costas loop is used for phase compensation.
II. If it is required to transmit the baseband signal m(t) given by:

$m(t)=30 \cos(2\pi x10^4 t)$ via

a. DSB-TC that modulates the carrier $100 \cos(2\pi x10^6 t)$
b. SSB that modulates the carrier $100 \cos(2\pi x10^6 t)$

For both modulation techniques:

i. Draw the block diagram of the system (transmitter and receiver).
ii. Write down the mathematical equation in time domain.
iii. Evaluate the total transmitted power and occupied bandwidth.

PROBLEM # THREE (25 mark)

I. How many FM audio channels could be broadcasted in FM band (88-108MHz) if frequency deviation equals 75 kHz and fm=5kHz?

II. An audio signal with amplitude $A_m = 4V$, and frequency fm=1200Hz is used to modulate the frequency of a carrier signal with modulation sensitivity $k_f = 5652$ *rad/sec/volt*

a. Write down the equation of the modulated signal.
b. Calculate the maximum frequency deviation.
c. Calculate the modulated signal bandwidth.

PROBLEM # FOUR (25 mark)

I. Define Figure of merit, Explain why it is important to study system noise?
II. Deduce then Compare between figures of merit of coherent and envelop detector receiver model.

Good Luck,

Dr. Salwa Serag Eldin

تعلم فليس صاحب علم كمن هو جاهل

	TANTA UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF ELECTRONICS & ELECTRICAL COMMUNICATION ENGINEERING EXAMINATION (*Second* YEAR)		
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DATE:10 /1/2013	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 3 HOURS

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Good Luck,

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تعلم فليس صاحب علم كمن هو جاهل

Tanta University

Department: Electronics & Comm. Engineering
Total Marks: 90 Marks

Faculty of Engineering

Course Title: Electronic Measurements (1)	Course Code: EEC2105	Year: 2nd
Date: January 2012 (First term)	Allowed time: 3 hrs	No. of Pages: (2)

Remarks: (answer the following questions… assume any missing data… answers should be supported by sketches…etc)

Question number (1) **(18 Marks)**

(a) Choose the right answer:

1. Precision referes to the exactness of successive measurements.
   True ( ) False ( )
2. The standard deviation of the measurement is a good indication of its precision.
   True ( ) False ( )
3. Capacitive transducers can be used for measurement of liquid level.
   True ( ) False ( )
4. In a digital electronic measuring instrument, the resolution is set by the number of bits used in the data word.
   True ( ) False ( )
5. Strain gauge uses the fact that when a wire is stretched, its resistance changes.
   True ( ) False ( )

(b) A voltmeter having a sensitivity of 1000Ω/V reads 40 V on its 150 V scale when connected across an unknown resistor in series with a mill-ammeter. When the mill-ammeter reads 800 mA, calculate: (i) apparent resistance of the unknown resistor,
(ii) actual resistance of the unknown resistor, and
(iii) error due to the loading effect of the voltmeter.

Question number (2) **(18 Marks)**

(a) Describe the principle of operation and construction of a strain gauge transducer. Explain how to improve its sensitivity.

(b) Describe the construction ,principle of operation, and applications of Hall Effect transducers.

(c) A resistor, at room temperature of 290°K has a noise voltage of 2μV for a 50 kHz bandwidth. Determine the temperature at which the noise voltage is 20% of its value at room temperature.

Question number (3) **(18 Marks)**

(a) Sketch the circuit model to explain the effect of ground loop noise , and show how to remove the noise voltage.

(b) A signal voltage of 3 μV and a noise voltage of 1 μV is measured at the input of an amplifier,
(i) what is the signal to noise ratio at the input of the amplifier
(ii) If the voltage gain of the amplifier is 20 ,what is the S/N ratio at the output
(iii) If the amplifier adds 5 μV of noise ,what is S/N ratio at the output? Calculate the noise factor and the noise figure.

Question number (4) **(15 Marks)**

(a) Sketch the circuit diagram of a practical form of a Wien bridge oscillator using a FET for amplitude stabilization and explain its operation.

(b) For the 555 Astable circuit shown in Fig1, Determine : (i) High state interval (ii) Low state interval (iii) duty cycle and frequency. (given : R_A= 20 kΩ , R_B= 300 kΩ , and C= 0.2 μF)

P.T.O. **Page:** 1 /2

Question number (5) **(15 Marks)**

a) Explain with help of a circuit diagram, the operating principle of a capacitance measuring meter using the phase shift characteristics of RC circuit. Show how parasitic capacitance can affect the accuracy of measurements. How to cancel the effect of input stray capacitance of the amplifier.

(b)(i) Explain with the help of the block diagram, the operating principle of a ramp type digital voltmeter and explain its operation.

(ii) Determine the resolution of $3^1/2$ digit display on a 5 V and 20 V ranges . Discuss your results

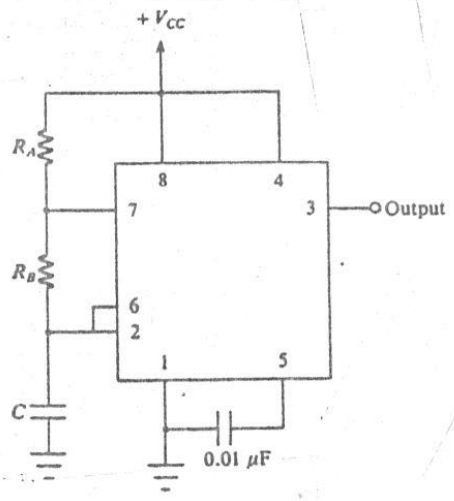


Fig.1

Good Luck ... Prof. Mustafa Mahmoud

TANTA UNIVERSITY

FACULTY OF ENGINEERING

DEPARTMENT OF ELECTRONICS AND ELECTRICAL COMM.DEPT

Year:2nd

COURSE TITLE: Electronic circuits and Measurements			COURSE CODE: EEC2146
DATE: 15- 1- 2013	TERM: FIRST	TOTAL MARKS: 85	TIME ALLOWED:3 HOURS

Answer the following Questions:

Question.1 (25Marks):

a) For the network of Fig.1, (R_C=2.2KΩ, R_E=0.56KΩ, R_B=470KΩ).

1. Drive an Expression for input impedance, output impedance, and voltage gain,then

2.Determine the following: re, Z_i,Z_o, A_v

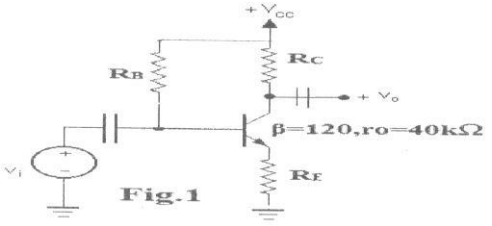


Fig.1

b)

1. Calculate the no-load Voltage gain and output Voltage of the RC-coupled transistor amplifiers of Fig.2.the component values are :(*R1*=*R5*=15kΩ, *R2*=*R6*=4.7kΩ, *R4*=*R8*=1kΩ, β=200, C1=C3=C5=10μF, C2=C4=20μF).

2. Calculate the overall gain if a 10kΩ load is applied to the second stage, and compare to results of part (1).

3. Calculate the input impedance of the First stage and the output impedance of the second stage.

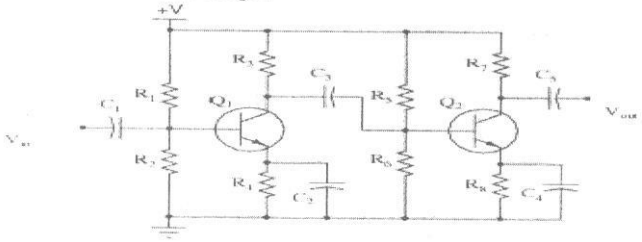


Fig.2

Question.2 (20Marks):

a) Determine the rate of change of the output voltage in response to the input square wave, as shown for the Integrator in Fig.3.the output voltage is initially zero.(*R*=10kΩ,*C*=0.01μF)

P.T.O

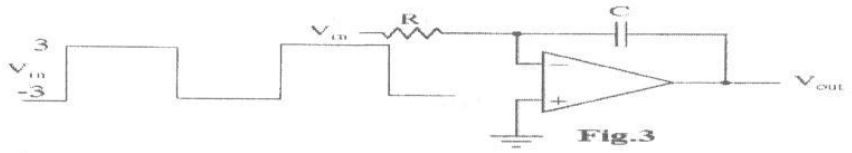


Fig.3

b) The circuit in Fig.4 shows the connection of three- stage amplifier of op amp with gains of +10,-18 and -27. Use a feedback resistor for all three circuits. Determine:

1. The value of three resistors (*R1, R2, R3*).
2. What output voltage will result for an input of 150 μV?

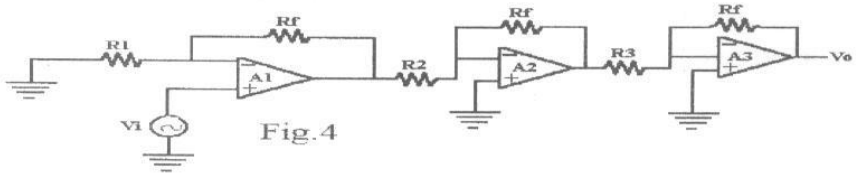


Fig.4

Question.3 (20Markes):

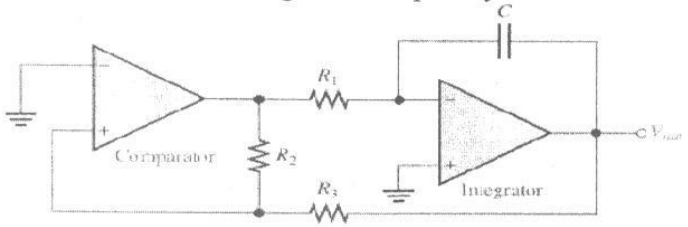
a) Explain briefly the operation of Wien bridge oscillator showing the frequency of oscillation.

b) For the circuit shown

1. What type of signal does the circuit produce?

2. If *R*1=22kΩ, *R*2=56kΩ, R3=18kΩ &C=0.022μF, determine the frequency of the output, V_{UTP}, V_{LTP}.

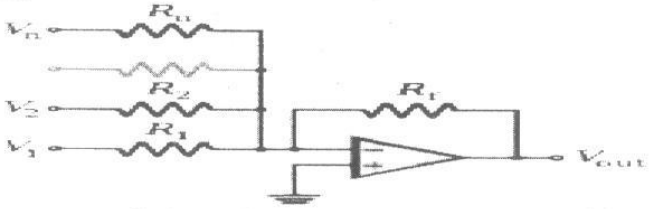
3. Show how to change the frequency of oscillation to 10 kHz



Question.4(20Markes):

a) Drive an expression for V_{out} of thecircuit shown.

b) What is this circuit name? What is the application for this circuit?



c) What are conditions for oscillation? Show using graphics.

Best wishes of success

University of Tanta | Department of Engineering Physics and Mathematics | Faculty of Engineering

Final Exam 2012/2013 - First Term

Course : Engineering Mathematics(A) (PME2110) | Time Allowed : 3 Hours

Students: 2nd Year (Communications and Electronics) | Total Mark : 85

Date : Sunday, January 20th, 2013 | Number of Pages: 2

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Answer The Following Questions

The First Question

Find the root correct to three decimal places of the equation $x \log_{10} x = 1.2$ using Newton-Raphson's method. (12 marks)

The Second Question

Using Newton's divided difference method find f(1.5) using the data f(1.0)=0.7651977, f(1.3)=0.6200860, f(1.6)=0.4554022, f(1.9)=0.2818186 and f(2.2)=0.1103623. (12 marks)

The Third Question

Using Simpson's 1/3 rule,

a - Evaluate the integration $\int_0^1 \frac{dx}{10+6x+x^2}$ with 4 subintervals. (8 marks)

b - Compare with the exact solution. (4 marks)

The Fourth Question

For the initial value problem $y' = -y - xy$, $y(0)=1$, $h=0.1$ for $x \in [0, 0.4]$,

a - Solve using Adams-Bashforth-Moultons predictor-corrector method. (4 marks)

b - Compute the starting values using Heun's method. (4 marks)

c - Compare the numerical solution with the exact solution. (4 marks)

The Fifth Question

For the boundary value problem $y'' = y' + 1$, $y(0) = 1$, $y(1) = 2(e - 1)$

a - Solve by finite difference method using central difference approximations with step length h=0.25. (8 marks)

b - Find the exact solution. (2 marks)

c - The absolute errors at the nodal points. (2 marks)

The Sixth Question

Solve the Poisson equation $u_{xx} + u_{yy} = x + y + 1$, for the square mesh [0,1]x[0,1], under the boundary conditions u(x,0)=2x, u(0,y)=-y, u(x,1)=2x-1 and u(1,y)=2-y using finite difference method and Gauss-Seidel iteration with mesh length h=1/3. Obtain the results correct to three decimal places. (13 marks)

The Seventh Question

Find the numerical solution of the heat equation $4u_t = u_{xx}$, $0 \leq x \leq 1$ subject to the conditions u(x,0)= 3x for $x \in \left[0, \frac{1}{2}\right]$ and 3(1-x) for $x \in \left[\frac{1}{2}, 1\right]$, u(0,t)=u(1,t)=0 using Schmidt method with step length h=0.25 and time step k=1/32. Integrate for two time steps.

(12 marks)

Good Luck and Best Wishes

Dr. Mohamed Elborhamy

Tanta University

Department: Electronics and Electrical Communication Eng.
Total Marks: 90 Marks

Faculty of Engineering

Course Title: Electronic Circuits (1)	Course Code: EEC 2103	Year: 2nd
Date: 22 /1/ 2013	Allowed time: 3 hours	No. of Pages: (3)

Remarks: (answer the following questions... assume any missing data... answers should be supported by sketches)

Question (1)

(a) Describe the limitations in operation of amplifier circuits, and show the reasons for output distortion in amplifier circuits (Support your answer with sketches).

(b) For the circuit shown in Figure (1), determine: r_e, Z_i, Z_o, A_i, and A_v.

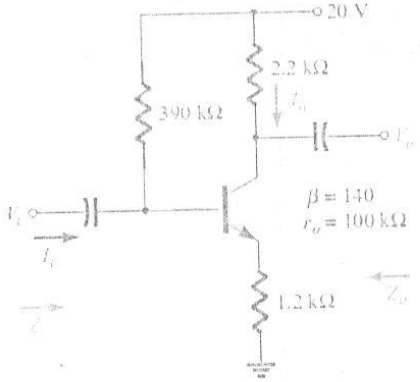


Figure (1)

Question 2

(a) Show the effect of bypass capacitor in amplifier.

(b) For the circuit shown in Figure (2):-

i. Calculate the overall voltage gain

ii. Calculate the input impedance of the first stage and the output impedance of the second stage.

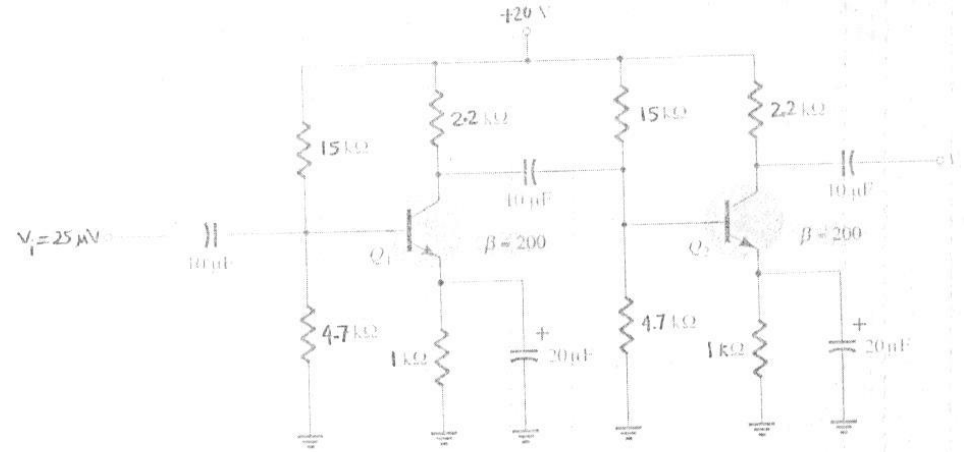


Figure (2)

Question 3

(a) Compare between Class A, Class AB, and Class C in terms of biasing, Q-point location, and efficiency; (Put your answer in a table). Sketch an electronic circuit for each class.

(b) Explain crossover distortion, its cause and the solution to eliminate it.

(c) For the Class-AB power amplifier shown in Figure (3). Determine

(i) I_{CQ}, V_{CEQ1}, and V_{CEQ2}

(ii) For 5 volt (r.m.s) as an input, find the power delivered to the load resistor.

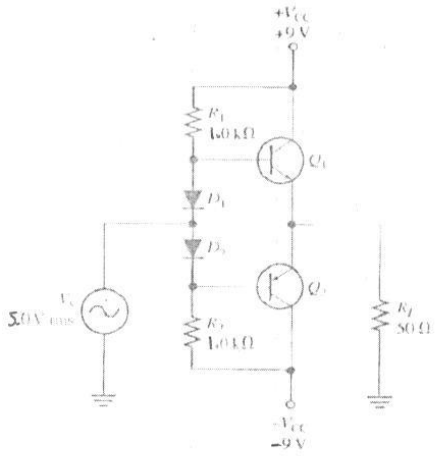


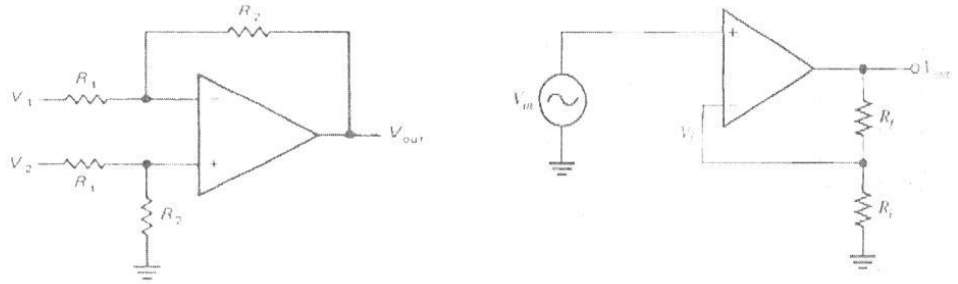
Figure (3)

Question 4

(a) Define the common-mode rejection ratio (CMRR).

(b) Compare between the differential mode and common mode.

(c) Find V_{out} in terms of the input voltage for both circuits shown in Figure (4).



(a) (b)

Figure (4)

Question 5

(a) State two types of oscillators.
(b) Discuss the start-up condition for oscillation.
(c) Sketch a circuit for Wien-bridge oscillator.
(d) Drive an expression for the attenuation and the resonant frequency of Wien-bridge oscillator

Best Wishes of Success

	TANTA UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF ELECTRONICS & ELECTRICAL COMMUNICATION final EXAMINATION (*second* YEAR)		
	COURSE TITLE: Technical Reports		COURSE CODE: EEC 2120
DATE: 24 /1/2013	TERM: FIRST	TOTAL ASSESSMENT MARKS:40	TIME ALLOWED:2 HOURS

Answer the following questions

Q1.(10 degrees)

a. State briefly the stages for TEAM development.
b. What are the main types of audience you must take into account?
c. Explain how to solve the sexist problem in technical writing?
d. What is plagiarism? Haw you can avoid it?

Q2. (10 degrees)

a. What is meant by resume? What are its essentials?
b. Write down your resume to be submitted as lab. Engineer
c. Describe the main characteristics for effective presentations
d. List the four Ps should be satisfied for good presentation

Q3. Mention whether the following sentences true or false then *correct* (10 degrees)

a. Capital letters are preferred when writing or presenting technical report
b. Sanserif fonts are clearer than serif fonts
c. Bullets are used when there is priority or sequence
d. Visual aids should be on audience's left
e. Abstract is the part Read first, written last
f. It is preferred to write in active voice in technical writing
g. Pie charts are used when presenting percentage data
h. It is preferred to use as many colors and fonts as possible

Q4. (10 degrees)

a. How to choose between tables and graphs when presenting data?
b. Discuss briefly when it is preferred to use bar charts, line graphs and scatter graphs.
c. Discuss how to use white spaces to make your document looks better

Good Luck,

Dr. Salwa Serag Eldin

Tanta University | Department: Elec. Power and Machines Engineering | Faculty of Engineering

Total Marks: 85 Marks

Course Title: Electromagnetic fields	Course Code: EPM 2104 – 2142	Year: 3rd
Date: 17 Jan 2013 (First term)	Allowed time: 3 hrs	No. of Pages: (2)

Answer the following questions:

Question (1) (16 Marks)

a) Using cylindrical coordinates, derive an expression for the electric field intensity E due to an infinite sheet of uniformly distributed charge with density ρ_s C/m^2. (6 Marks)

b) A circular ring of radius a carries a uniform charge ρ_L C/m placed on the xy-plane with its axis along the z-axis. (10 Marks)

1- Find E at $(0, 0, h)$.

2- If two identical point charges Q are placed at $(0, a, 0)$ and $(0, -a, 0)$ in addition to the ring, find the value of Q such that $E = 0$ on z-axis.

Question (2) (16 Marks)

a) State (without proof) the divergence theorem. How can you use this theorem to get the continuity equation of current? (6 Marks)

b) A uniform line charge of 30 nC/m is located on the z-axis, and a uniform volume charge density of 100 μC/m^3 is located in the cylindrical region $2 < \rho < 3$ cm around z-axis. Find D everywhere. (10 Marks)

Question (3) (18 Marks)

a) Derive the boundary conditions at the interface between a conductor and a dielectric. (4 Marks)

b) If $E = y\ a_x + x\ a_y + 2\ a_z$ V/m, find the work done in carrying a point charge of 2 C along the straight line path from: (7 Marks)

1- A(1, 0, 1) toward B(0.8, 0.6, 1).

2- B(0.8, 0.6, 1) toward A(1, 0, 1).

c) Two concentric spherical conductors with the inner conductor of radius 2 cm and the outer conductor of internal radius 6 cm as shown in Figure 1. Two layers of dielectric materials fill the space between the two conductors. The inner layer has a relative permittivity of $\varepsilon_{r1} = 2$ and thickness of 1 cm, while, the outer layer has a relative permittivity of $\varepsilon_{r2} = 3$. Find the capacitance C. Derive any expression used. (7 Marks)

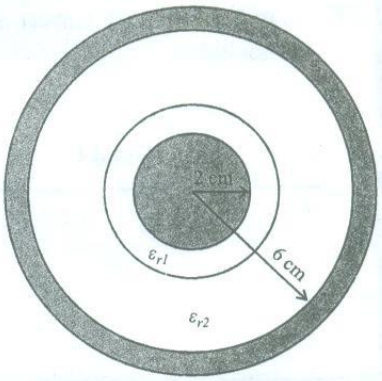


Figure 1

Question (4) (19 Marks)

a)

(i) Use ampere's circular law to find out H and B inside an infinite long straight non-magnetic conductor whose centre line is along the z-axis and of radius a meters carrying a uniform current density of J A/m^2. (7 Marks)

(ii) Show that $\nabla \times \overline{H} = J$. (3 Marks)

(iii) Find the total magnetic flux crossing the surface defined by:
$z = 0 \; ; \frac{a}{40} \leq r \leq \frac{a}{2} \; ; \pi \leq \varphi \leq 2\pi$
(3 Marks)

b) Consider a semicircular conducting wire of radius a, carrying a current I, with its centre at the origin as shown in Figure 2. Given a magnetic flux density $\overline{B} = B_1 \, \overline{a}_\emptyset + B_2 \, \overline{a}_z$ Tesla, find the total force acting on the wire. (6 Marks)

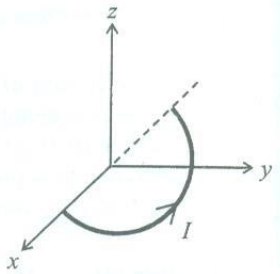


Figure 2

Question (5) (16 Marks)

a) Two neighbour telephone circuits A and B situated in air in one plane as shown in Figure 3. Determine the mutual inductance per unit length between the two circuits A and B. (10 Marks)

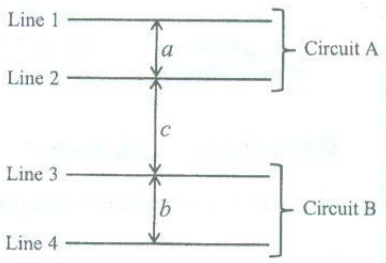


Figure 3

b) In a material whose conductivity is σ mho/m and relative permittivity is ε_r, the electric field varies with time t as A sin ωt. Find the densities of conduction current and displacement current in A/m^2 and the frequency at which they have equal magnitudes. (6 Marks)

Good Luck

Assoc. Prof. Ahmed I. Shobair
Dr. Diaa-Eldin A. Mansour